CHARGE NO: 2306

PROJECT TITLE: FLAVOR COMPONENT EVALUATION

PROJECT LEADER: R. M. IKEDA

PERIOD COVERED: SEPTEMBER, 1982 - FEBRUARY, 1983

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OBJECTIVE:

Apply the Purge and Trap/Gas Chromatographic headspace procedure to the study of flavor related problems.

STATUS:

A. Flavor Loss During Manufacture

To study possible flavor losses during manufacturing, a batch of Marlboro KS filler was sampled at the after-cut flavor cylinder exit, at the silo exit, and from packaged cigarettes. P&T/GC volatiles scans showed a reduction in some components, especially very volatile ones, between the A/C cylinder exit and the silo exit. The major differences, however, were between filler from the silo exit and the filler from packaged cigarettes. There were 20 additional peaks in the packaged cigarette filler which were not present in the silo exit filler, as well as 20 peaks which were smaller and 10 peaks which were larger. Therefore, the packaging and/or adhesives are apparently contributing significantly to the headspace volatiles.

B. Players and Raffles

An extensive study was made of the volatiles of Players and Raffles cigarettes due to a perceived off-taste in these brands. P&T/GC scans were made of the filler of unpackaged Players, Players packed in Players boxes, and of components of the boxes. It was shown that some very large volatiles peaks present in the Players boxed cigarettes are due to the printing on the Players box. These peaks are not present in unpackaged or B&H DUL packaged Players cigarettes. Some extra volatiles peaks were also present in the Players cigarettes packed in B&H DUL boxes, however, these were less intense and in a different part of the scan than those from the Players box. The extra peaks due to the Players box printing were present in both the rods and filters in about equal concentration. It was also shown that these peaks were not greatly reduced in cigarettes from unopened Players packs after 2-3 weeks, so they do not readily dissipate from the unopened boxes. It is obvious, therefore, that packaging volatiles do transfer to the cigarettes and may adversely affect the taste of the cigarettes and must be considered to be an inadvertent additive to the product.

P&T/GC volatiles scans of UK Players cigarette filler and printed box, which is a similarly colored package, also had large peaks in the same area of the GC scan.

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C. Coumarin in Cigarettes and Flavors

Due to the recent popular media interest in coumarin in cigarettes, the P&T/GC volatiles scans made in the last two years of various U.S. brands of cigarettes were reexamined to find those in which coumarin had been detected. A report (1) was issued listing these brands with a rough estimate of the amount present. In addition, four flavors were screened for Operations Services for coumarin content.

D. Miscellaneous Applications

1. Barclay

The taste of U.S. and Swiss made Barclay cigarettes were found to be quite different. The volatiles scans were very different indicating completely different flavor systems.

2. Northwind

The loss of "Creme de Menthe" flavor peaks during accelerated aging was studied by P&T/GC. (2)

3. Cabarrus Merit

P&T/GC volatiles scans were made of a large number of Cabarrus made Merit cigarettes in connection with a possible off-odor problem in the factory start-up.

4. Marlboro - Two Silo/Four Maker/4 Days

P&T/GC volatiles were examined on Marlboro filler sampled from M/C on four different days from two silos and four makers from each silo. There were some intensity differences in about 20 different peaks and this information was reported to Vivian Willis for possible correlation with subjective smoking results. (3)

5. Marlboro - Overheated

Marlboro cigarettes which the filler may have been overheated were examined and the volatiles were slightly less than in the control, but probably not significantly less.

6. P&S Multipass Dryers

Volatiles of Marlboro, Merit and Burley fillers run thru the dryers at 150 and 170°F were compared. With Marlboro filler, there were 25 peaks with different intensities at the two temperatures, most of which were lower at the higher temperature. Merit had 20 and Burley 17 peaks whose intensity varied at the two temperatures, some being more intense and some less intense. Subjective smoking found differences in the Marlboro only.

7. Dunhill Plastic Box

Dunhill boxes containing Merit regular and menthol cigarettes

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were subjected to accelerated aging and the boxes and cigarette fillers examined by P&T/GC. No volatiles from the boxes were detected in the fillers and no significant adsorption of filler volatiles was detected in the boxes. (4) Additionally, four raw materials for making plastic boxes were examined for volatiles content.

PLANS:

1. Do volatiles scans as requested.

2. Further studies of packaging volatiles.

3. Use cryogenic cooling in GC to obtain better resolution and sharper peaks at front end of GC scans.

4. Accumulate GC relative retention time data based on ethyl esters for identification of flavor and tobacco compounds.

REFERENCES

1. Special Report, Coumarin in U.S. Cigarettes, 2/8/83, A. M. Palmer 83-032

2. Memo from A.M. Palmer to Barbara G. Taylor, Northwind Aging Studies - Purge and Trap/GC Volatiles, 11/22/82

3. Memo from A.M. Palmer to Vivian E. Willis, P&T/GC Volatiles of Two Silo/Four Maker Marlboro Study, 11/23/82

4. Memo from A.M. Palmer to Paula J. Thomas, Dunhill Plastic Boxes, 2/3/82

5. Notebook 7731, pp 111-138

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